REMARKS

Claim 1 has been amended, and claims 2-8 remain dependant on claim 1. Claims 9 and 10 were previously canceled. Claims 11 and 12 have been withdrawn. Accordingly, claims 1-8 remain in this application for examination.

Specification Objection

Applicants have submitted a clean copy of the Abstract on a separate sheet. As such, the objection is traversed.

Claim Rejections Under 35 U.S.C. §112

Applicants have amended claim 1 to obviate the rejection under section 112, second paragraph. As amended, claim 1 recites the intermediate layer is established of a thickness for diffusion of a portion of said single layer of nickel of the intermediate layer directly into the overlay to form an initially absent tin-nickel layer between a remaining portion of the single layer of nickel and the overlay.

Further, claim 1 recites that the layer thickness of the intermediate nickel layer is greater than 4 μm as applied to the bearing metal layer to "prevent" full diffusion of the intermediate layer into said overlay. The examiner contends that full diffusion would depend on time and environmental conditions during use and/or the process used in the diffusion, and further, that full diffusion could occur at high temperatures and long time periods. However, applicants have found, surprisingly, that the claimed thicknesses of the intermediate layer and the overlay provide the desirable result of forming a diffused layer without full diffusion of the intermediate layer. Thus, it is believed that the claimed intermediate and overlay layers result in patentable subject matter, and are not indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention. This is further supported in the detailed description, such as at page 5, lines 1-6.

With regard to claim 8, the claimed composite multilayer material as claimed in claim 1, has undergone an aging process. Accordingly, the structure as claimed in claim 8 has undergone an aging process to provide the interdiffusion layer of substantially tin

and nickel between the nickel intermediate layer and the overlay. As such, the structures of claim 1 and 8 are not simultaneous as questioned by the examiner.

Claim Rejections Under 35 U.S.C. §103(a):

Applicants traverse the rejection of claims 1-8 as being obvious over Huhn (U.S. 2001/0016267, referred to hereafter as Huhn). Claim 1 recites a composite multilayer material having a backing layer, a bearing metal layer, an intermediate layer and an overlay. The overlay has about 0 - 20 wt.% of at least one of copper or silver, the rest being tin. The intermediate layer is a single layer of nickel having a thickness greater than 4 µm as applied to the bearing metal layer, with the intermediate layer being in direct contact with the bearing metal layer and the overlay for diffusion of a portion of the single layer of nickel directly into the overlay.

As detailed in the previous response, Huhn does not disclose nor suggest a multilayer material having a single intermediate layer of nickel having a thickness greater than 4 µm arranged in direct contact with an overlay and a bearing metal layer. The only hint of a single intermediate layer of nickel within Huhn, as noted by the examiner, is in paragraph [0008] where it states that a nickel intermediate is provided as a diffusion barrier between a bearing metal layer and an overlay. In paragraph [0009] it then goes on to state that these layer configurations have only limited load carrying capacities and are often no longer suitable for loads imposed by new engine developments. Accordingly, applicants contend that the prior art discussed in Huhn falls far short of directing one of ordinary skill in the art to applicants' claimed single intermediate nickel layer multilayer material having a thickness greater than 4 µm which has been found by applicants to overcome the shortcomings discussed in paragraph [0009] of Huhn. Applicants further note that prior art constructions having a single intermediate nickel layer, prior to applicants discovery, as discussed in applicants' application on page 4, line 31 - page 5, line 10, have used relatively thin nickel layers, i.e. 1-3 µm, since they do not have good sliding characteristics and are intended if necessary to allow wear quickly to reach the bearing metal layer beneath them. Accordingly, it is applicants' belief that use of a relatively thick single nickel intermediate layer, greater than 4 µm, in view of Huhn is counterintuitive, and not at all an "obvious" solution to extending the useful life of a bearing material.

So, given the heretofore belief that use of a single intermediate layer of nickel results in an inferior bearing material, Huhn discloses use of a dual intermediate layer, and specifically a bearing metal layer 1 applied to a steel backing layer, with a first intermediate layer 2 of nickel applied to the bearing metal layer; a second intermediate layer 3 of nickel-tin applied to the first intermediate layer 2, and an overlay 4 of a tin matrix 5 applied to the second intermediate layer 3. The second intermediate layer 3 is necessary to provide the bearing material with its increased service life by facilitating diffusion of tin from the overlay into the second intermediate layer an also facilitating diffusion of nickel from the first intermediate layer 2 into the second intermediate layer 3 (paragraph [0048]). Accordingly, the pure nickel layer 2 of Huhn is not in direct contact with the overlay 4, as claimed by Applicants, but rather is blocked from the overlay 4 by the instrumental second intermediate layer 3 of nickel-tin. The first intermediate layer 2 of nickel is preferably from 1 to 4µm (paragraph [0030]) in order to maintain the ratio of nickel-tin in the second intermediate layer in approximately an atomic ratio of 1:1 by diffusion of some of the nickel of the first intermediate layer 2 into the second intermediate layer and diffusion of tin from the overlay 4 into the second intermediate layer 2. Accordingly, the thickness of the first intermediate nickel layer 2 provides a specific function of contributing to the equilibrium-determined growth of the second intermediate tin-nickel layer 3, in that the tin-nickel layer 3 is fed with tin from the overlay 4 and with nickel from the first intermediate layer 2. As such, the 1:1 ratio of tin to nickel in the second intermediate tin-nickel layer is maintained (paragraph [0030]).

Applicants disagree with the examiner's contention that there is no justification in applicants' disclosure for distinguishing between a single intermediate layer of nickel having a thickness of less that 4µm versus one having a thickness greater than 4µm. In any regard, applicants believe this is moot point given the distinction above of their invention over Huhn. However, as noted in the previous response, applicants' disclosure acknowledges the prior art (EP1113180, corresponding to Huhn, now issued as US Pat. No. 6,492,039, and assigned to Applicants' assignee) having the dual intermediate layers, one of nickel with a thickness of 1-4µm and the other of tin-nickel, wherein the two layers cooperate to provide a system which adapts itself to an applied load, wherein the load carrying capacity is increased via growth of the tin-nickel layer. However, Huhn does not direct one to applicants' claimed multilayer bearing material having a single

nickel intermediate layer that must be greater than 4μm in order to avoid complete consumption of the nickel layer via diffusion of the nickel layer into the tin of the overlay, which in turn would lead to detachment of the top layers, now consisting of tin-nickel from the bearing metal layer. As previously noted, the only mention of a single intermediate layer of nickel in Huhn in is paragraphs [0008-0009].

The notion posited by the examiner that one would eliminate the second intermediate layer 3 of nickel-tin for economic reasons, thereby leaving the first intermediate layer of nickel between 1-4 μm is without support. Applicants contend that if one of ordinary skill in the art were to eliminate the second intermediate layer 3 for economic reasons, they would simultaneously reduce the thickness of the first intermediate layer 2 of nickel for reasons addressed above, namely, that pure nickel layers are believed to not have good sliding characteristics and are intended if necessary to allow wear quickly to reach the bearing metal layer beneath them. Further, if one is concerned about economics, they would also look to save by reducing the thickness of the nickel layer.

Accordingly, claim 1 is believed to define patentable subject matter and to be in proper form for allowance. Such action is respectfully requested.

Claims 2-8 are ultimately dependant upon amended claim 1, and thus, are believed to define patentable subject matter for at least the same reasons and to be in proper form for allowance. Such action is respectfully requested.

It is believed that this application now is in condition for allowance. Further and favorable action is requested.

The Patent Office is authorized to charge or refund any fee deficiency or excess to Deposit Account No. 04-1061.

Respectfully submitted,

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